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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,702	06/01/2001	Katsuki Ohashi	04329.2072-01	3974

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EXAMINER

MOHAMEDULLA, SALEHA R

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 06/04/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/870,702

Applicant(s)

OHASHI ET AL.

Examin r

Saleha R. Mohamedulla

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) 35-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34, 54 and 55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restriction

1. Claims 35-53 are withdrawn from further consideration by the Examiner, 37 CFR 1.142(b) as being drawn to a non-elected invention. Election was made without traverse in Paper No. 7. Claims 1-34, 54 and 55 are considered by the Examiner.

Information Disclosure Statement

2. References listed in the IDS, Paper No. 5, were provided by the Applicant in Japanese. They have been considered to the extent possible, since the Examiner does not read Japanese. The Examiner requests the Applicant's assistance in obtaining an English translation of the references listed.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claims are objected to because of the following informalities:

4. Dependent claims 2-17 recite "a method of repairing a sample according to claim" in the preamble. However, claim 1, from which claims 2-17 depend, recites "a method of preparing a

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sample” in the preamble. The preambles are inconsistent, and either claim 1 or claims 2-17 should be amended to recite consistent preambles. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 1 recites the limitation "the pattern of the sample" in line 8. Claims 15 and 16 also recite "the pattern." There is insufficient antecedent basis for this limitation in the claim. The claim does not previously recite that the sample has a pattern. It is not inherent and it is not a property that the sample has a pattern. Claims 2-17 are rejected as being dependent on claim 1. The Examiner suggests changing "the pattern" to "a pattern" in claim 1.

7. Claim 18 recites the limitation "the pattern of the sample" in line 8. Claims 32 and 33 also recite "the pattern." There is insufficient antecedent basis for this limitation in the claim. The claim does not previously recite that the sample has a pattern. It is not inherent and it is not a property that the sample has a pattern. Claims 19-34 are rejected as being dependent on claim 18. The Examiner suggests changing "the pattern" to "a pattern" in claim 18.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 54 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over US# 5,572,598 to Wihl et al. in view of US# 4,579,455 to Levy et al.

Wihl teaches an automated photomask inspection system and method wherein the photomask is moved in a serpentine path. The photomask is moved relative to the laser. Wihl teaches that a laser light is generated by the system (col. 2, line 35-40) and used to inspect the photomask (sample). Defect detection occurs by comparing two images, either die-to-die images or die-to-database images (col. 4, lines 42-52). The photomask may be a phase shifting photomask and the amount of the phase shift between two reflected light beams impinging on the mask is detected at each point on the mask (col. 4, lines 32-35). Because the laser beam is impinging on a phase shift mask, the phase of the laser beam is changed, therefore, the brightness of the laser beam varies as the laser beam exits the phase shift mask. That is, on the exiting surface of the mask, the laser beam brightness varies. The laser beam is continuously scanned or swept across the mask (col. 5, lines 11-20). In addition, the laser is continuously emitted from the light source (col. 5, lines 26-31). Therefore, the brightness varies with time. Therefore, Wihl teaches irradiating a sample with a laser beam while changing a phase of the laser beam with time, thereby permitting brightness on the sample to vary with time. Brightness

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on the sample varies with time because the brightness on the exiting surface phase shift mask varies with time.

Wihl teaches that a time delay integration sensor may be used during scanning of the photomask (col. 14, lines 16-25). Wihl does not specifically teach that an image of the photomask is acquired using the sensor or that an image is processed.

Levy teaches a method of inspecting photomasks by comparing die patterns to detect defects in the photomasks in real time. Levy teaches that patterns are continuously stored into pixel memories. By periodic light scanning, images are formed and stored into memories using time circuits (col. 2, line 50 – col. 3, line 10; col. 5, lines 20-30). The pixel values measure the light transmitted by areas on the mask, thereby measuring the mask pattern, using time sensors that store the amount of light transmitted into the pixel memories. The speed of the defect detection is controlled by timing control circuits that provide timing signals to coordinate the sequences of the inspection process (col. 5, lines 30-40). Left and right inspection optics are positioned so as to focus identical portions of two die patterns of the photomask onto respective left and right detectors (col. 4, lines 65-70). Analog signals, which ultimately form the pixel representations, are formed by the detectors (col. 5, lines 1-5). Therefore, Levy teaches an image forming step of acquiring an image of the sample, using a sensor placed on an image plane of the sample. The analog signals are converted to digital signals to form the pixel representations (col. 5, lines 5-10). Two-dimensional pixel representations of the two die patterns are formed, and defects in the die patterns are found at points of non-agreement between the pixel representations (Abstract). Therefore, Levy teaches an image processing step of processing signals obtained by the sensor, so as to inspect a pattern of the sample. Levy also teaches the claim 55 limitation that

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a two-dimensional image is obtained by use of a sensor wherein elements are arranged in two dimensions. That is, the pixels are arranged in two dimensions.

The references are analogous art as they are drawn to photomask inspection methods. It would have been obvious to one of ordinary skill in the art to use the time delay integration sensor of Levy in the method of Wihl in order to resolve smaller defects while inspecting larger areas in a shorter amount of time (Wihl; col. 1, lines 40-60). Wihl specifically teaches the use of the time delay integration sensor of Levy (Wihl; col. 14, lines 16-25).

Allowable Subject Matter

9. Claims 1-34 would be allowable if rewritten or amended to overcome the claim objections and rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action. Independent claims 1 and 18 recite the allowable subject matter indicated in the prosecution of parent Application No. 09/263,937.

10. The prior art does not teach or suggest generating a laser beam, changing a phase of the laser beam to smooth the brightness distribution of the laser beam, applying the laser beam to the sample, acquiring an image of the sample with a sensor, and outputting an image signal from the sensor in accordance with relative movement of the laser beam and the sample, detecting a defect of a pattern of the sample on the basis of the image signal output from the sensor, specifying the position of the defect of the pattern on the basis of the result obtained by the detecting step and repairing the defect of the pattern.

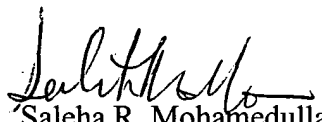
11. The prior art does not teach or suggest generating a laser beam, changing a phase of the laser beam to smooth the brightness distribution of the laser beam, applying the smoothed laser

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beam to the sample, acquiring an image of the sample using a sensor while the laser beam and the sample are relatively moved, and examining the image of the sample for a defect of a pattern of the sample.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Saleha Mohamedulla whose telephone number is (703) 308-1260. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Mark Huff, can be reached on (703) 308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310. The After Final fax phone number is (703) 872-9311. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Saleha R. Mohamedulla
Patent Examiner
Technology Center 1700

May 31, 2003